

(19)



(11)

EP 3 836 129 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

11.10.2023 Bulletin 2023/41

(51) International Patent Classification (IPC):

G09F 9/33 (2006.01)

(52) Cooperative Patent Classification (CPC):

G09F 9/33; H01L 25/0753

(21) Application number: **20184063.4**

(22) Date of filing: **03.07.2020**

(54) LED DISPLAY WATERPROOF STRUCTURE

WASSERDICHTER STRUKTUR EINER LED-ANZEIGE

STRUCTURE D'AFFICHAGE À DEL ÉTANCHE À L'EAU

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **12.12.2019 CN 201911275638**

(43) Date of publication of application:

16.06.2021 Bulletin 2021/24

(73) Proprietor: **Unilumin Group Co. Ltd.**

Shenzhen, Guangdong 518103 (CN)

(72) Inventors:

- **LIU, Yuanxian**
Guangdong (CN)
- **YANG, Kuang**
Guangdong (CN)

(74) Representative: **Monteiro Alves, Inês**

Alameda Dos Oceanos, Nº 41K-21
Parque das Nações
1990-207 Lisboa (PT)

(56) References cited:

CN-A- 109 764 133 CN-U- 204 884 445
CN-U- 207 966 361 CN-U- 208 335 643

EP 3 836 129 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of LED display, in particular to a LED display waterproof structure.

BACKGROUND

[0002] The conventional LED display waterproof structure is mainly used to solve the waterproof problem caused by the signal seat via holes between the display bottom case and the power supply cavity (specifically the bottom plate of the power supply box). The existing method to solve this problem is mainly to provide a waterproof cover and a sealing ring, that is, a sealing ring is added at the connection between the waterproof cover and the display bottom case to seal and waterproof. The conventional sealing ring is usually a flat structure, which needs to be sealed by pressing back and forth. For the outdoor LED display module with small pitch, due to its small dot spacing, it is not possible to achieve front maintenance by inserting a knob with a hex wrench, that is, the display bottom case cannot be provided with screws around the sealing ring, such that the sealing ring cannot be compressed, and the purpose of sealing and waterproofing cannot be achieved.

[0003] CN109764133A provides a seal ring. The seal ring comprises a ring body, the ring body comprises an annular groove, first convex rings are arranged on the upper surface and the lower surface of the bottom wall of the annular groove, and the first convex rings are closed rings the same with the extension direction of the annular groove. According to the seal ring, the side wall of the annular groove has the effect of reducing water impact force, the pressure between the first convex rings and a sealed body is increased, and the seal property of the first convex rings can be improved; the invention further provides an LED display screen; the display screen comprises a module, a box body, a power box and multiple seal rings, the seal ring between the power box and the box body is the first seal rubber ring, and the seal ring between the box body and the module is the second seal rubber ring; according to the LED display screen, the seal properties of the first seal rubber ring and the second seal rubber ring are good, and the seal property of the LED display screen is improved.

[0004] CN207966361U discloses an outdoor waterproof LED display screen that is convenient for splicing, which includes at least two LED display boxes and assembling members. The LED display box includes a frame and at least two LED modules, and each LED module is evenly arranged on the frame. The LED module includes a module bottom shell, a lamp board and a face shell installed in the module bottom shell, and the lamp board is screwed and fixed on the module bottom shell. There is a power box on the back of the frame. The power

box includes a shell and a power box cover. The gap between the shell and the power box cover is filled with waterproof rubber ring. The housing is provided with a plurality of fixed buckles, and the power supply box cover is fixed on the housing through the fixed buckles.

SUMMARY

[0005] The main objective of the present disclosure is to provide an LED display waterproof structure, which aims to solve the waterproof and sealing problems of the outdoor LED display module with small pitch.

[0006] In order to achieve the above objective, the present disclosure provides an LED display waterproof structure according to claim 1, wherein the LED display waterproof structure includes a display bottom case, a first sealing ring and a waterproof cover, a side surface of the display bottom case provided with the waterproof cover defines first signal seat via holes and a first U-shaped ring groove surrounding the first signal seat via holes, a side surface of the first sealing ring towards the waterproof cover is provided with a second U-shaped ring groove, a side surface of the waterproof cover towards the display bottom case is provided with a ring protrusion matching the second U-shaped ring groove, the waterproof cover is provided on the first U-shaped ring groove through the first sealing ring, thereby the ring protrusion is connected to an inner side wall of the second U-shaped ring groove through interference fit, and an outer side wall of the second U-shaped ring groove is connected to the first U-shaped ring groove through interference fit, a surface of the display bottom case is provided with a first signal seat via hole, and the first U-shaped ring groove is configured to surround the first signal seat via hole, the waterproof cover is provided with second signal seat via holes configured to correspond one-to-one with the first signal seat via hole, the LED display waterproof structure further includes a power supply box bottom plate, the power supply box bottom plate is provided with a third signal seat via hole configured to correspond one-to-one with the second signal seat via hole; and the power supply box bottom plate is connected to a second surface of the waterproof cover opposite to the first surface; the LED display waterproof structure further includes a second sealing ring between the power supply box bottom plate and the waterproof cover.

[0007] In an embodiment, both the inner side wall and the outer side wall of the second U-shaped ring groove are provided with protrusions, and each of the protrusions is provided around the inner side wall of the second U-shaped ring groove or around the outer side wall of the second U-shaped ring groove.

[0008] In an embodiment, a bottom wall of the second U-shaped ring groove is provided with vent holes configured to conduct an airflow between the first U-shaped ring groove and the second U-shaped ring groove.

[0009] In an embodiment, first ribs are provided in a

groove of the second U-shaped ring groove, and two ends of each first rib are respectively connected to two inner side walls of the second U-shaped ring groove; grooves are provided on a top of the ring protrusion, and the grooves are configured to correspond one-to-one with the first ribs.

[0010] The second signal seat via holes are provided on the waterproof cover, the second signal seat via holes are configured to correspond one-to-one with the first signal seat via holes; the LED display waterproof structure further includes a power supply box bottom plate, and third signal seat via holes are provided on the power supply box bottom plate, the third signal seat via holes are configured to correspond one-to-one with the second signal seat via holes; the power supply box bottom plate is tightly connected to a surface of the waterproof cover towards the power supply box bottom plate through screw structures.

[0011] The LED display waterproof structure further includes a second sealing ring, and the second sealing ring is between the power supply box bottom plate and the waterproof cover.

[0012] In an embodiment, a side surface of the waterproof cover towards the power supply box bottom plate is provided with a third U-shaped ring groove, the third U-shaped ring groove is configured to correspond with the ring protrusion, cylindrical blind holes are provided in the third U-shaped ring groove, the second sealing ring is a flat ring structure, second cylinders are provided on a surface of the second sealing ring towards the waterproof cover, and the second cylinders are configured to correspond one-to-one with the cylindrical blind holes.

[0013] In an embodiment, second ribs are provided in the groove of the third U-shaped ring groove, and two ends of each second rib are respectively connected to two inner side walls of the third U-shaped ring groove.

[0014] In an embodiment, a side surface of the second sealing ring towards the waterproof cover is provided with two first flat annular protrusions, and a first groove is between the two first flat annular protrusions, the second cylinders are provided in the first groove; a side surface of the waterproof cover towards the power supply box bottom plate is further provided with two ring grooves, and the two ring grooves are configured to correspond one-to-one with the two first flat annular protrusions.

[0015] In an embodiment, a height of a side wall of the ring groove adjacent to the third U-shaped ring groove is lower than a height of a side wall of the ring groove away from the third U-shaped ring groove.

[0016] The present disclosure provides an LED display waterproof structure, including a display bottom case, a first sealing ring and a waterproof cover. The waterproof cover is provided on the first U-shaped ring groove of the display bottom case through the first sealing ring, such that the ring protrusion is connected to an inner side wall of the second U-shaped ring groove through interference fit, and an outer side wall of the second U-shaped ring groove is connected to the first U-shaped ring groove

through interference fit. As such, the LED display waterproof structure can realize the front and back compression of the first sealing ring without a screw structure, ensuring a tight connection between the waterproof cover and the display bottom case. Meanwhile, the ring protrusion is connected to the inner side wall of the second U-shaped ring groove through interference fit, and the outer side wall of the second U-shaped ring groove is connected to the first U-shaped ring groove through interference fit, multiple waterproofing can be formed by one sealing ring to further improve the overall waterproofing performance. It can be seen that this technical solution can effectively solve the waterproof and sealing problems of the outdoor LED display with small pitch.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] In order to more clearly illustrate the embodiments of the present disclosure or the technical solutions in the related art, the drawings used in the embodiments or the related art will be briefly described below. Obviously, the drawings in the following description are only some embodiments of the present disclosure. It will be apparent to those skilled in the art that other figures can be obtained from the structures illustrated in the drawings without the inventive effort.

FIG. 1 is an exploded schematic view of an LED display waterproof structure according to an embodiment of the present disclosure.

FIG. 2 is a partial structural view of a first sealing ring of the LED display waterproof structure shown in FIG. 1.

FIG. 3 is a schematic structural view of a waterproof cover of the LED display waterproof structure shown in FIG. 1 from another perspective.

FIG. 4 is a partial structural view of the waterproof cover of the LED display waterproof structure shown in FIG. 1.

FIG. 5 is a partial structural view of a second sealing ring of the LED display waterproof structure shown in FIG. 1.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] The specific implementation of the present disclosure will be further described below with reference to the drawings. It should be noted that the description of these embodiments is used to help understand the present disclosure, but does not constitute a limitation on the present disclosure. In addition, the technical features involved in the embodiments of the present disclosure described below can be combined with each other as long as there is no conflict with each other.

[0019] As shown in FIG. 1 to FIG. 3, an embodiment of the present disclosure provides an LED display waterproof structure 100. The LED display waterproof structure 100 includes a display bottom case 110, a first seal-

ing ring 120 and a waterproof cover 130. The display bottom case 110 is provided on a side surface of the waterproof cover 130 with first signal seat via holes 111 and a first U-shaped ring groove 112 surrounding the first signal seat via holes 111, a side surface of the first sealing ring 120 towards the waterproof cover 130 is provided with a second U-shaped ring groove 121, a side surface of the waterproof cover 130 towards the display bottom case 110 is provided with a ring protrusion 131 matching the second U-shaped ring groove 121, the waterproof cover 130 is provided on the first U-shaped ring groove 112 through the first sealing ring 120, thereby the ring protrusion 131 is connected to an inner side wall of the second U-shaped ring groove 121 through interference fit, and an outer side wall of the second U-shaped ring groove 121 is connected to the first U-shaped ring groove 112 through interference fit.

[0020] In the present embodiment, as shown in FIG. 2, both the inner side wall and the outer side wall of the second U-shaped ring groove 121 are provided with protrusions 122, and each of the protrusions 122 is provided around the inner side wall of the second U-shaped ring groove 121 or around the outer side wall of the second U-shaped ring groove 121. Specially, in this embodiment, two loops of protrusions 122 are provided on the two inner side walls of the second U-shaped ring groove 121. When the ring protrusion 131 is connected to the inner side wall of the second U-shaped ring groove 121 through interference fit, the ring protrusion 131 can be pressed by the two loops of protrusions 122, thereby forming a double waterproof protection between the two and before and after the two to further ensure the sealing performance between the two.

[0021] As shown in FIG. 2 and FIG. 3, a bottom wall of the second U-shaped ring groove 121 is provided with vent holes 123. First cylinders 132 are provided on the top of the ring protrusion 131. The first cylinders 132 are configured to correspond one-to-one with the vent holes 123. First ribs 124 are provided in a groove of the second U-shaped ring groove 121, and two ends of each first rib 124 are respectively connected to two inner side walls of the second U-shaped ring groove 121; grooves 133 are provided on a top of the ring protrusion 131, and the grooves 133 are configured to correspond one-to-one with the first ribs 124. As such, when the ring protrusion 131 is connected to the inner side wall of the second U-shaped ring groove 121 through interference fit, the first cylinders 132 are inserted into the corresponding vent holes 123, while the first ribs 124 are inserted into the corresponding grooves 133. The arrangement of the first ribs 124 serves to strengthen the connection in the groove of the second U-shaped ring groove 121. The first cylinders 132 are inserted into the corresponding vent holes 123, which can play the role of quickly expelling the air in the groove of the second U-shaped ring groove 121 from the vent holes 123, such that the second U-shaped ring groove 121 communicates with the first U-shaped ring groove 112. The display module on the bot-

tom case 110 generates heat during operation, so that the air in the first U-shaped ring groove 112 increases in pressure due to the temperature increase. Since the bottom wall of the second U-shaped ring groove 121 is provided with the vent holes 123, the air pressure inside and outside the second U-shaped ring groove 121 is balanced. Furthermore, the outer side wall of the first sealing ring 120 and the inner side wall of the first U-shaped ring groove 112 are closely adhered to each other, thereby ensuring a good waterproof effect between the first sealing ring 120 and the bottom case 110. Besides, ribs 134 are further provided on the surface of the waterproof cover 130 towards the display bottom case 110. The ribs 134 are provided on the outer side of the ring protrusion 131. Each rib 134 extends in the direction of the center of the ring protrusion 131, and each rib 134 is provided with a gap between the outer side wall of the ring protrusion 131 and the gap is greater than 0.05 mm. When the ring protrusion 131 is connected to the inner side wall of the second U-shaped ring groove 121 through interference fit, the ring protrusion 131 may press the outer side wall of the second U-shaped ring groove 121, to ensure a tight connection between the two.

[0022] As shown in FIG. 1, second signal seat via holes 135 are provided on the waterproof cover 130, the second signal seat via holes 135 are configured to correspond one-to-one with the first signal seat via holes 111. The LED display waterproof structure further 100 includes a power supply box bottom plate 140, and third signal seat via holes 141 are provided on the power supply box bottom plate 140, the third signal seat via holes 141 are configured to correspond one-to-one with the second signal seat via holes 135; the power supply box bottom plate 140 is tightly connected to a surface of the waterproof cover 130 towards the power supply box bottom plate 140 through screw structures (not shown). Specially, threaded blind holes (not shown) are provided on the surface of the power supply box bottom plate 140 towards the waterproof cover 130, and the thread blind holes are configured to correspond one-to-one with the screw via holes 136 to achieve a threaded connection between the two.

[0023] In order to ensure a tight connection between the power supply box bottom plate 140 and the waterproof cover 130, as shown in FIG. 1, the LED display waterproof structure 100 further includes a second sealing ring 150, and the second sealing ring 150 is between the power supply box bottom plate 140 and the waterproof cover 130. Specially, as shown in FIG. 4 and FIG. 5, a side surface of the waterproof cover 130 towards the power supply box bottom plate 140 is provided with a third U-shaped ring groove 137, the third U-shaped ring groove 137 is configured to correspond with the ring protrusion 131, cylindrical blind holes 138 are provided in a groove of the third U-shaped ring groove 137, the second sealing ring 150 is a flat ring structure, second cylinders 151 are provided on a surface of the second sealing ring 150 towards the waterproof cover 130, and the second

cylinders 151 are configured to correspond one-to-one with the cylindrical blind holes 138. Second ribs 139 are provided in the groove of the third U-shaped ring groove 137, and two ends of each second rib 139 are respectively connected to two inner side walls of the third U-shaped ring groove 137. A side surface of the second sealing ring 150 towards the waterproof cover 130 is provided with two first flat annular protrusions 152, and a first groove body 153 is between the two first flat annular protrusions 150, the second cylinders 151 are provided in a groove of the first groove body 153; a side surface of the waterproof cover 130 towards the power supply box bottom plate 140 is further provided with two ring grooves 1310, and the two ring grooves 1310 are configured to correspond one-to-one with the two first flat annular protrusions 152. Specially, a height of a side wall of the ring groove 1310 adjacent to the third U-shaped ring groove 137 is lower than a height of a side wall of the ring groove 1310 away from the third U-shaped ring groove 137. As such, when the second sealing ring 150 is provided on the surface of the waterproof cover 130 towards the power supply box bottom plate 140, the second cylinders 151 are inserted into the corresponding cylindrical blind holes 138 one by one, and the two first flat annular protrusions 152 are also placed in the corresponding circular grooves 1310 one by one. The arrangement of the second ribs 139 serves to strengthen the connection in the groove of the third U-shaped ring groove 137, and the two first flat annular protrusions 152 can also play a double waterproof protection role between the second sealing ring 150 and the waterproof cover 130.

[0024] Besides, as shown in FIG. 5, a side surface of the second sealing ring 150 towards the power supply box bottom plate 140 is provided with two second flat annular protrusions 154, and a second groove 155 is between the two second flat annular protrusions 154. In this way, when the waterproof cover 130 installed with the second sealing ring 150 is tightly connected to the power supply box bottom plate 140 through several screw structures (not shown), the two second flat annular protrusions 154 can play a double waterproof protection role between the second sealing ring 150 and the power supply box bottom plate 140.

[0025] An LED display waterproof structure in the embodiments of the present disclosure includes a display bottom case, a first sealing ring and a waterproof cover. The waterproof cover is provided on the first U-shaped ring groove of the display bottom case through the first sealing ring, such that the ring protrusion is connected to an inner side wall of the second U-shaped ring groove through interference fit, and an outer side wall of the second U-shaped ring groove is connected to the first U-shaped ring groove through interference fit. As such, the LED display waterproof structure can realize the front and back compression of the first sealing ring without a screw structure, ensuring a tight connection between the waterproof cover and the display bottom case. Mean-

while, the ring protrusion is connected to the inner side wall of the second U-shaped ring groove through interference fit, and the outer side wall of the second U-shaped ring groove is connected to the first U-shaped ring groove through interference fit, multiple waterproofing can be formed by one sealing ring to further improve the overall waterproofing performance. It can be seen that this technical solution can effectively solve the waterproof and sealing problems of the outdoor LED display with small pitch.

Claims

1. An LED display waterproof structure (100) comprising a display bottom case (110), a first sealing ring (120) and a waterproof cover (130), wherein:

a side surface of the display bottom case (110) is provided with a first U-shaped ring groove (112);

a side surface of the first sealing ring (120) towards the waterproof cover (130) is provided with a second U-shaped ring groove (121);

a first surface of the waterproof cover (130) is provided with a ring protrusion (131) matching the second U-shaped ring groove (121);

the waterproof cover (130) is provided on the first U-shaped ring groove (112) through the first sealing ring;

the ring protrusion (131) is connected to the second U-shaped ring groove (121) through interference fit;

the second U-shaped ring groove (121) is connected to the first U-shaped ring groove (112) through interference fit;

a surface of the display bottom case (110) is provided with a first signal seat via hole (111), and the first U-shaped ring groove (112) is configured to surround the first signal seat via hole (111);

the waterproof cover (130) is provided with second signal seat via holes (135) configured to correspond one-to-one with the first signal seat via hole (111);

the LED display waterproof structure (100) further comprises a power supply box bottom plate (140), the power supply box bottom plate (140) is provided with a third signal seat via hole (141) configured to correspond one-to-one with the second signal seat via hole (135); and the power supply box bottom plate (140) is connected to a second surface of the waterproof cover (130) opposite to the first surface;

wherein the LED display waterproof structure (100) further comprises a second sealing ring (150) between the power supply box bottom plate (140) and the waterproof cover (130).

2. The LED display waterproof structure (100) of claim 1, wherein:

both an inner side wall and an outer side wall of the second U-shaped ring groove (121) are provided with protrusions (122); and each of the protrusions (122) is configured to surround the inner side wall of the second U-shaped ring groove (121) or the outer side wall of the second U-shaped ring groove (121).

3. The LED display waterproof structure (100) of claim 1, wherein a bottom wall of the second U-shaped ring groove (121) is provided with vent holes (123).

4. The LED display waterproof structure (100) of claim 1, wherein:

a groove of the second U-shaped ring groove (121) is provided with first ribs (124), two ends of each of the first ribs (124) are respectively connected to two inner side walls of the second U-shaped ring groove (121); and a top of the ring protrusion (131) is provided with grooves (133) configured to correspond one-to-one with the first ribs (124).

5. The LED display waterproof structure (100) of claim 1, wherein the ring protrusion (131) of the waterproof cover (130) is configured to form a third U-shaped ring groove (137) on the second surface of the waterproof cover (130).

6. The LED display waterproof structure (100) of claim 5, wherein:

a groove of the third U-shaped ring groove (137) is provided with a cylindrical blind hole (138); and a first surface of the second sealing ring (150) is provided with a second pillar (151) configured to be inserted into the cylindrical blind hole (138).

7. The LED display waterproof structure (100) of claim 5, wherein:

second ribs (139) are provided in the groove of the third U-shaped ring groove (137); and two ends of each of the second ribs (139) are respectively connected to two inner side walls of the third U-shaped ring groove (137).

8. The LED display waterproof structure (100) of claim 1, wherein:

the first surface of the second sealing ring (150) is provided with a first flat annular protrusion (152); and

the second surface of the waterproof cover (130) is provided with a circular groove (1310) configured to be inserted into the first flat annular protrusion (152).

9. The LED display waterproof structure (100) of claim 8, wherein:

the second sealing ring (150) is provided with two concentric first flat annular protrusions (152); and a first groove body (153) is between the two first flat annular protrusions (152).

10. The LED display waterproof structure (100) of claim 8, wherein:

a second surface of the second sealing ring (150) opposite to the first surface is provided with two concentric second flat annular protrusions (154); and a second groove body (155) is between the two second flat annular protrusions (154).

11. The LED display waterproof structure (100) of claim 1, wherein:

the first U-shaped ring groove (112) is a circular ring groove; or the second U-shaped ring groove (121) is a circular ring groove.

Patentansprüche

1. Wasserdichte Struktur (100) für eine LED-Anzeige, umfassend ein unteres Anzeigegehäuse (110), einen ersten Dichtungsring (120) und eine wasserdichte Abdeckung (130),

wobei eine Seitenfläche des unteren Anzeigegehäuses (110) mit einer ersten U-förmigen Ringnut (112) versehen ist;

wobei eine der wasserdichten Abdeckung (130) zugewandte Seitenfläche des ersten Dichtungsringes (120) mit einer zweiten U-förmigen Ringnut (121) versehen ist;

wobei eine erste Oberfläche der wasserdichten Abdeckung (130) mit einem Ringvorsprung (131) versehen ist, der zu der zweiten U-förmigen Ringnut (121) passt;

wobei die wasserdichte Abdeckung (130) auf der ersten U-förmigen Ringnut (112) durch den ersten Dichtungsring vorgesehen ist;

wobei der Ringvorsprung (131) mit der zweiten U-förmigen Ringnut (121) durch Presspassung verbunden ist;

wobei die zweite U-förmige Ringnut (121) mit

- der ersten U-förmigen Ringnut (112) durch Presspassung verbunden ist;
wobei eine Oberfläche des unteren Anzeigegehäuses (110) mit einem ersten Signalsitz-Durchgangsloch (111) versehen ist und die erste U-förmige Ringnut (112) so konfiguriert ist, dass sie das erste Signalsitz-Durchgangsloch (111) umgibt;
wobei die wasserdichte Abdeckung (130) mit zweiten Signalsitz-Durchgangslöchern (135) versehen ist, die so konfiguriert sind, dass sie eins zu eins mit dem ersten Signalsitz-Durchgangsloch (111) übereinstimmen;
wobei die Wasserdichte Struktur (100) für eine LED-Anzeige ferner eine Stromversorgungsbox-Bodenplatte (140) umfasst, wobei die Stromversorgungsbox-Bodenplatte (140) mit einem dritten Signalsitz-Durchgangsloch (141) versehen ist, das so konfiguriert ist, dass es eins zu eins mit dem zweiten Signalsitz-Durchgangsloch (135) übereinstimmt; und wobei die Stromversorgungsbox-Bodenplatte (140) mit einer zweiten Oberfläche der wasserdichten Abdeckung (130) verbunden ist, die der ersten Oberfläche gegenüberliegt, und
wobei die wasserdichte Struktur (100) für eine LED-Anzeige außerdem einen zweiten Dichtungsring (150) zwischen der Stromversorgungsbox-Bodenplatte (140) und der wasserdichten Abdeckung (130) umfasst.
2. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 1, wobei sowohl eine innere Seitenwand als auch eine äußere Seitenwand der zweiten U-förmigen Ringnut (121) mit Vorsprüngen (122) versehen sind; und
wobei jeder der Vorsprünge (122) so gestaltet ist, dass er die innere Seitenwand der zweiten U-förmigen Ringnut (121) oder die äußere Seitenwand der zweiten U-förmigen Ringnut (121) umgibt.
 3. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 1, wobei eine Bodenwand der zweiten U-förmigen Ringnut (121) mit Entlüftungslöchern (123) versehen ist.
 4. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 1, wobei eine Nut der zweiten U-förmigen Ringnut (121) mit ersten Rippen (124) versehen ist, wobei zwei Enden jeder der ersten Rippen (124) jeweils mit zwei inneren Seitenwänden der zweiten U-förmigen Ringnut (121) verbunden sind; und
wobei ein oberer Teil des Ringvorsprungs (131) mit Nuten (133) versehen ist, die so gestaltet sind, dass sie eins zu eins mit den ersten Rippen (124) übereinstimmen.
 5. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 1, wobei der Ringvorsprung (131) der wasserdichten Abdeckung (130) so konfiguriert ist, dass er eine dritte U-förmige Ringnut (137) auf der zweiten Oberfläche der wasserdichten Abdeckung (130) bildet.
 6. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 5, wobei eine Nut der dritten U-förmigen Ringnut (137) mit einem zylindrischen Sackloch (138) versehen ist; und
wobei eine erste Oberfläche des zweiten Dichtungsringes (150) mit einer zweiten Säule (151) versehen ist, die so konfiguriert ist, dass sie in das zylindrische Sackloch (138) eingesetzt werden kann.
 7. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 5, wobei zweite Rippen (139) in der Nut der dritten U-förmigen Ringnut (137) vorgesehen sind; und
wobei zwei Enden jeder der zweiten Rippen (139) jeweils mit zwei inneren Seitenwänden der dritten U-förmigen Ringnut (137) verbunden sind.
 8. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 1, wobei die erste Oberfläche des zweiten Dichtungsringes (150) mit einem ersten flachen ringförmigen Vorsprung (152) versehen ist, und
wobei die zweite Oberfläche der wasserdichten Abdeckung (130) mit einer kreisförmigen Nut (1310) versehen ist, die so konfiguriert ist, dass sie in den ersten flachen ringförmigen Vorsprung (152) eingesetzt werden kann.
 9. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 8, wobei der zweite Dichtungsring (150) mit zwei konzentrischen ersten flachen ringförmigen Vorsprüngen (152) versehen ist, und
wobei sich ein erster Nutkörper (153) zwischen den beiden ersten flachen ringförmigen Vorsprüngen (152) befindet.
 10. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 8, wobei eine zweite Oberfläche des zweiten Dichtungsringes (150), die der ersten Oberfläche gegenüberliegt, mit zwei konzentrischen zweiten flachen ringförmigen Vorsprüngen (154) versehen ist; und
wobei sich ein zweiter Nutkörper (155) zwischen den beiden zweiten flachen ringförmigen Vorsprüngen (154) befindet.
 11. Wasserdichte Struktur (100) für eine LED-Anzeige nach Anspruch 1, wobei die erste U-förmige Ringnut (112) eine kreisförmige Ringnut ist; oder
wobei die zweite U-förmige Ringnut (121) eine kreisförmige Ringnut ist.

Revendications

1. Structure étanche d'écran LED (100), comprenant un boîtier inférieur d'écran (110), une première bague d'étanchéité (120) et un couvercle étanche (130), dans laquelle :

une surface latérale du boîtier inférieur d'écran (110) est pourvue d'une première rainure annulaire en forme U (112) ;

une surface latérale de la première bague d'étanchéité (120) vers le couvercle étanche (130) est pourvue d'une deuxième rainure annulaire en forme U (121) ;

une première surface du couvercle étanche (130) est pourvue d'une saillie annulaire (131) s'adaptant à la deuxième rainure annulaire en forme U (121) ;

le couvercle étanche (130) est prévu sur la première rainure annulaire en forme U (112) à travers la première bague d'étanchéité ;

la saillie annulaire (131) est reliée à la deuxième rainure annulaire en forme U (121) par ajustement sans jeu ;

la deuxième rainure annulaire en forme U (121) est reliée à la première rainure annulaire en forme U (112) par ajustement sans jeu ;

une surface du boîtier inférieur d'écran (110) est pourvue d'un premier trou traversant de siège de signalisation (111), et la première rainure annulaire en forme U (112) est configurée pour entourer le premier trou traversant de siège de signalisation (111) ;

le couvercle étanche (130) est pourvu de deuxièmes trous traversants de siège de signalisation (135) configurés pour correspondre de manière biunivoque au premier trou traversant de siège de signalisation (111) ;

la structure étanche d'écran LED (100) comprend en outre une plaque inférieure du boîtier d'alimentation (140), la plaque inférieure du boîtier d'alimentation (140) est pourvue d'un troisième trou traversant de siège de signalisation (141) configuré pour correspondre de manière biunivoque au deuxième trou traversant de siège de signalisation (135) ; et la plaque inférieure du boîtier d'alimentation (140) est reliée à une deuxième surface du couvercle étanche (130) à l'opposé de la première surface ;

dans laquelle la structure étanche d'écran LED (100) comprend en outre une deuxième bague d'étanchéité (150) entre la plaque inférieure du boîtier d'alimentation (140) et le couvercle étanche (130).

2. Structure étanche d'écran LED (100) selon la revendication 1, dans laquelle :

une paroi latérale interne et une paroi latérale externe de la deuxième rainure annulaire en forme U (121) sont pourvues chacune d'une saillie (122) ; et

chacune des saillies (122) est configurée pour entourer la paroi latérale interne de la deuxième rainure annulaire en forme U (121) ou la paroi latérale externe de la deuxième rainure annulaire en forme U (121).

3. Structure étanche d'écran LED (100) selon la revendication 1, dans laquelle une paroi inférieure de la deuxième rainure annulaire en forme U (121) est pourvue de trous d'évent (123).

4. Structure étanche d'écran LED (100) selon la revendication 1, dans laquelle :

une rainure de la deuxième rainure annulaire en forme U (121) est pourvue de premières nervures (124), deux extrémités de chacune des premières nervures (124) sont respectivement reliées à deux parois latérales internes de la deuxième rainure annulaire en forme U (121) ; et la saillie annulaire (131) est pourvue à sa partie supérieure, de rainures (133) configurées pour correspondre de manière biunivoque aux premières nervures (124).

5. Structure étanche d'écran LED (100) selon la revendication 1, dans laquelle la saillie annulaire (131) du couvercle étanche (130) est configurée pour former une troisième rainure annulaire en forme U (137) sur la deuxième surface du couvercle étanche (130).

6. Structure étanche d'écran LED (100) selon la revendication 5, dans laquelle :

une rainure de la troisième rainure annulaire en forme U (137) est pourvue d'un trou borgne cylindrique (138) ; et

une première surface de la deuxième bague d'étanchéité (150) est pourvue d'un deuxième pilier (151) configuré pour être inséré dans le trou borgne cylindrique (138).

7. Structure étanche d'écran LED (100) selon la revendication 5, dans laquelle :

des deuxièmes nervures (139) sont prévues dans la rainure de la troisième rainure annulaire en forme U (137) ; et deux extrémités de chacune des deuxièmes nervures (139) sont respectivement reliées à deux parois latérales internes de la troisième rainure annulaire en forme U (137).

8. Structure étanche d'écran LED (100) selon la reven-

dication 1, dans laquelle :

la première surface de la deuxième bague d'étanchéité (150) est pourvue d'une première saillie annulaire plate (152) ; et 5
la deuxième surface du couvercle étanche (130) est pourvue d'une rainure circulaire (1310) configurée pour être insérée dans la première saillie annulaire plate (152). 10

9. Structure étanche d'écran LED (100) selon la revendication 8, dans laquelle :

la deuxième bague d'étanchéité (150) est pourvue de deux premières saillies annulaires plates concentriques (152) ; et 15
un premier corps de rainure (153) est prévu entre les deux premières saillies annulaires plates (152). 20

10. Structure étanche d'écran LED (100) selon la revendication 8, dans laquelle :

une deuxième surface de la deuxième bague d'étanchéité (150) à l'opposé de la première surface est pourvue de deux deuxièmes saillies annulaires plates concentriques (154) ; et 25
un deuxième corps de rainure (155) est prévu entre les deux deuxièmes saillies annulaires plates (154). 30

11. Structure étanche d'écran LED (100) selon la revendication 1, dans laquelle :

la première rainure annulaire en forme U (112) 35
est une rainure circulaire ; ou
la deuxième rainure annulaire en forme U (121)
est une rainure circulaire.

40

45

50

55

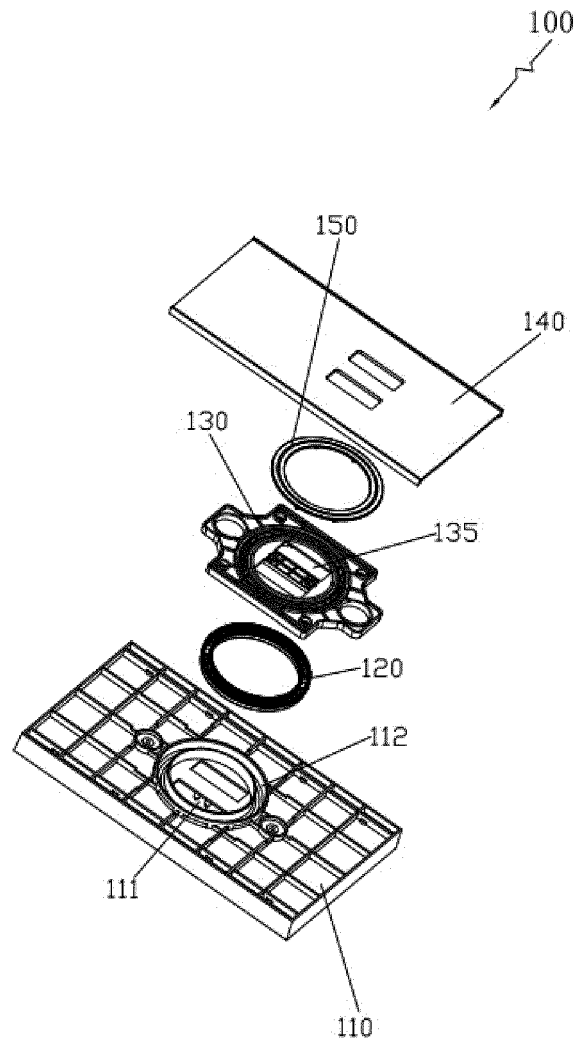


FIG. 1

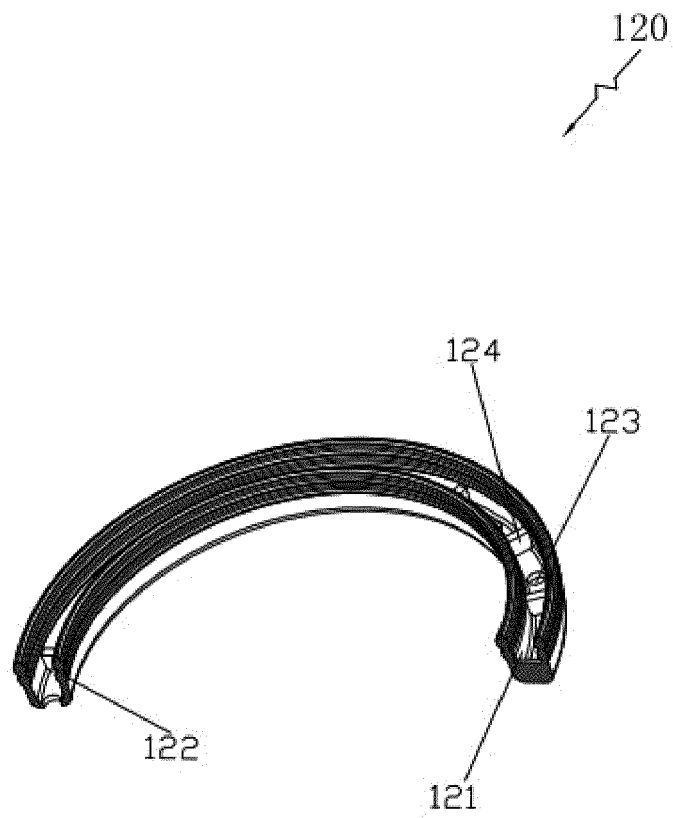


FIG. 2

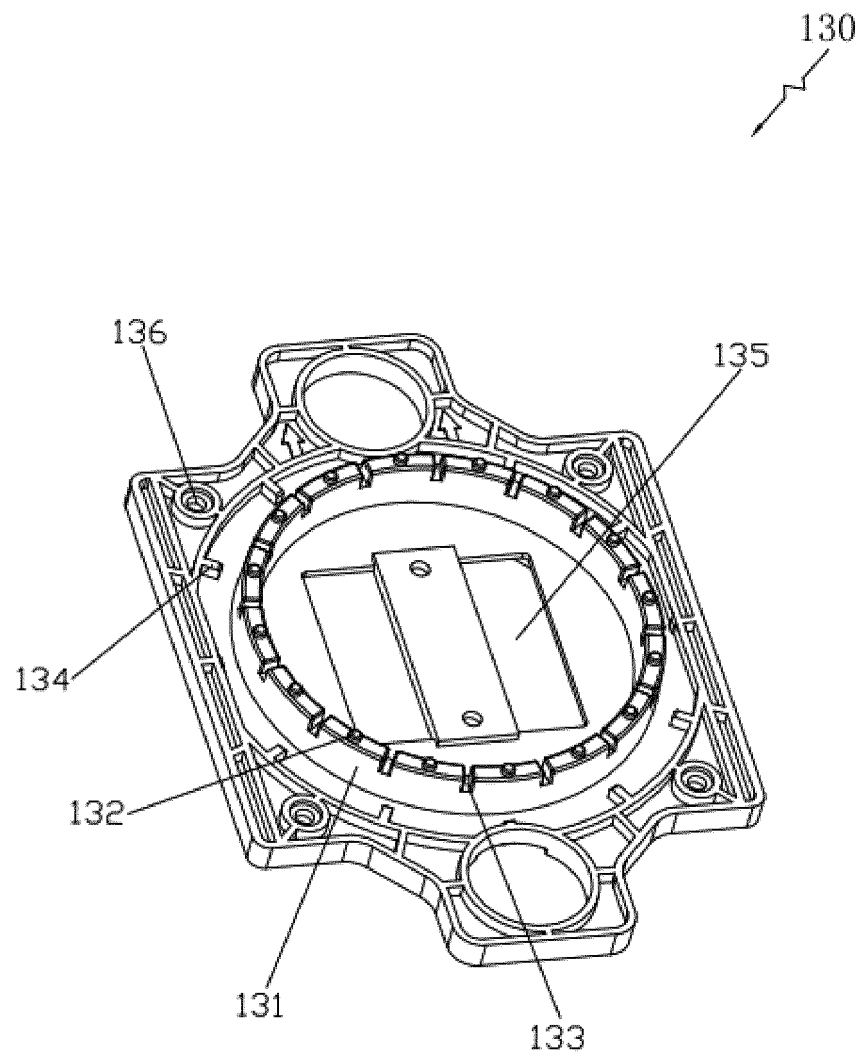


FIG. 3

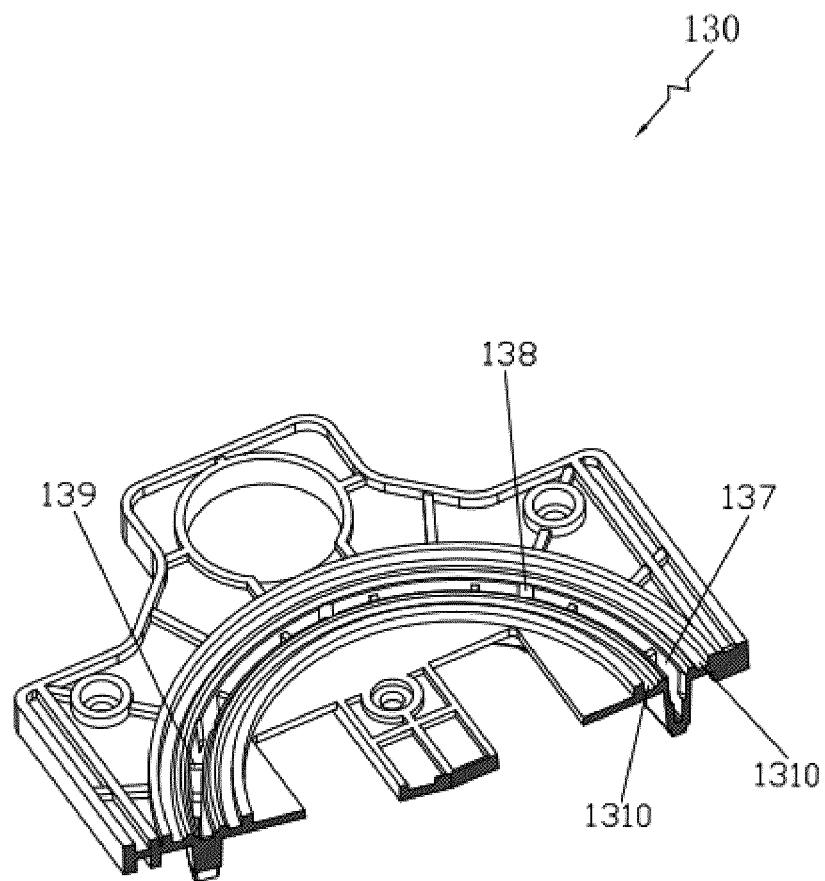


FIG. 4

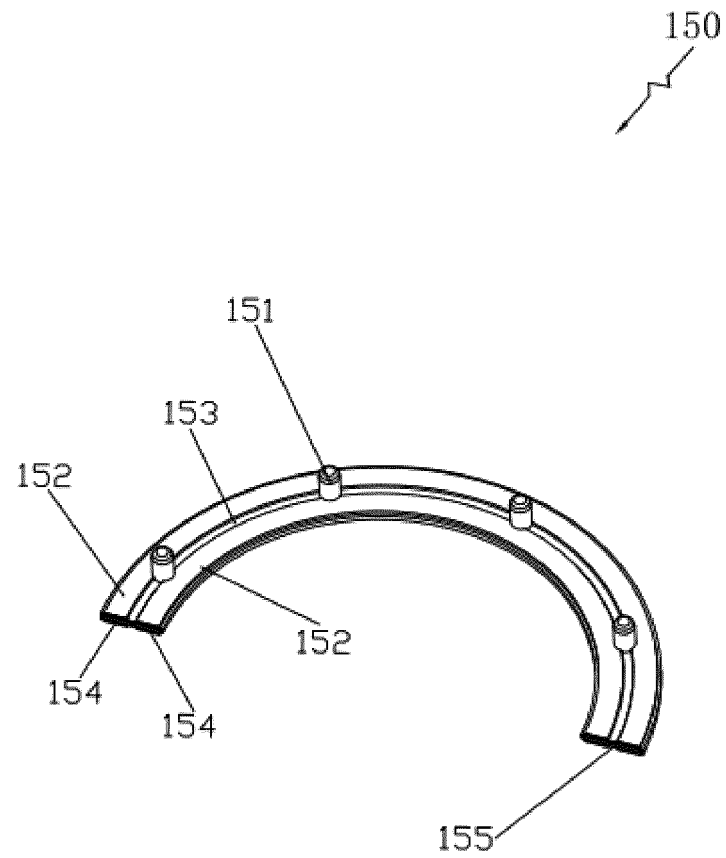


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 109764133 A [0003]
- CN 207966361 U [0004]